MERCURY ISSUES

Mercury Health Impacts in Wisconsin

All forms of mercury can have some affect on the human nervous system although the form that is most responsible for human health impacts is methyl-mercury. It is known to cause severe neurological disorders in infants exposed during pregnancy. The most common path of mercury to enter the body is from the consumption of fish. Using the current 0.05 ppm mercury in fish tissue standard, nearly all of the water bodies in Wisconsin have some type of fish consumption advisory.

Mercury Deposition on In-State Lakes

The amount of mercury that is deposited to Wisconsin's lakes varies not only from year to year but also geographically based mainly on meteorological conditions including the amount of precipitation that occurs in a particular location. Currently, the Department operates 5 monitoring sites as a part of the national MDN (mercury deposition network). They include Brule River, Trout Lake, Popple River (northern sites), and Devil's Lake, and Lake Geneva (southern sites). The yearly deposition for the sites (not including Devil's Lake) for 1995 through 2000 is contained in the attached graph. The Devil's Lake site began operation in 2001.

- The annual mercury wet deposition values for 2000 are 9.2 ug/m2 at Brule River, 9.2 ug/m2 at Trout Lake, 7.5 ug/m2 at Popple River, and 14.5 ug/m2 at Lake Geneva.

Impact of the Proposed Rule on Fish Advisories

The impact of the proposed rule on fish advisories in Wisconsin is uncertain at this time. In other words, it is unknown which water bodies (if any) will have a decrease in mercury loading as a result of the proposed rule. It is also unknown if any water bodies will be removed from the state's fish consumption advisory list as a result of the proposed mercury rule.

- *Mercury in Fish Tissue Standard* – The current Wisconsin standard for mercury in fish tissue is 0.05 parts per million. Basically, the state adopted the same federal EPA standard in the beginning of 2001. All of the 1200 water bodies that have been tested by the Department exceed the current 0.05 mercury in fish tissue standard. Nearly all of the water bodies in Wisconsin have some level of fish consumption advisories due to mercury contamination.

- *Water Model* – The latest model available that can predict the transport and fate of mercury in lakes is called the Dynamic Mercury Cycling Model (D-MCM). It is being used for the Devil's Lake TMDL pilot project that should have preliminary results early in 2002.

Amount of Mercury Deposition from In-State Sources

The amount (or percentage) of mercury deposition to Wisconsin that results from in-state sources is uncertain at this time. There are a number of studies that are currently on-going that should help answer this question. They include the Devil's Lake TMDL pilot project and DNR's mercury modeling analysis. However, keep in mind that because of the great complexities involved in modeling mercury transport and deposition, these studies will only begin to shed some light on an understanding of out-of-state versus in-state sources.

- *Mercury Modeling* – The capability to model mercury transport and deposition is improving. Several models exist including REMSAD, TEAM (developed for EPRI), HYSPLIT, and C-MAQ. The

important note here is that existing models have different mercury chemistry and we can't rely on one model to fully understand in-state versus out-of-state sources of mercury. We need a model comparison.

- *Speciation* – The EPA's Utility ICR (information collection request) helped to answer questions regarding the different species of mercury (elemental, gaseous, and particulate) emitted by utilities. In general, the scientific community believes that elemental mercury is deposited further away from the source while gaseous and particulate mercury is deposited closer to the source. Problem is that the percentage of mercury species emitted varies with the different utility boilers. There are also differences in mercury speciation in the plume versus what is found in the stack (ICR data was based on stack testing). There are still questions regarding cloud physics and what happens to mercury after it is released to the atmosphere.

- *Devil's Lake TMDL Pilot* – Uses REMSAD model. EPA is scheduled to provide DNR with preliminary results of atmospheric modeling in January 2002.

- *DNR Analysis* – Also will use REMSAD model. To be completed in about two years.

- *Mercury Report to Congress* – Used RELMAP model that is generally regarded today as out-of-date and inadequate for modeling mercury transport and deposition.